Listing of the Claims

1. (Currently Amended) Device for the *in vivo* determination of the concentration of a PET tracer in blood, including

- an image-producing device ~~(5, 6)~~ for the locally resolved depiction of a region of the body;
- a TOF-PET unit ~~(3a, 3b)~~ for recording the concentration of the tracer in a predetermined volume element;
- a data processing unit ~~(7)~~ which is coupled to the image-producing device ~~(5, 6)~~ and the TOF-PET unit ~~(3a, 3b)~~ and is arranged to set the TOF-PET unit ~~(3a, 3b)~~ in such a way that the volume element ~~(2)~~ that is recorded with this lies in a body volume that is filled with blood, wherein the spatial position ~~(r)~~ of the body volume is determined with the aid of the image-producing device ~~(5, 6)~~.

2. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein the TOF-PET unit comprises two γ detector elements ~~(3a, 3b)~~ that lie opposite one another, and the corresponding evaluation electronics unit for recording the times of flight of annihilation quanta ~~(γ_1, γ_2)~~.

3. (Currently Amended) Device as claimed in claim 2, ~~characterized in that~~ wherein the effective area of each detector element is approximately 10 mm^2 to approximately 400 mm^2.

4. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein the image-producing device includes an MRI device, ~~and/or~~ an X-ray projection device ~~(5, 6), in particular~~ or an X-ray computer tomography device.

5. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein it includes a PET device ~~(4)~~ for preferably three-dimensional recording of the distribution of the PET tracer in a body region.

6. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein the data processing unit ~~(7) is set up to segment~~ segments a body volume that is filled with blood into images ~~(A)~~ produced by the image-producing device ~~(5, 6)~~.

7. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein it includes a display device ~~(8)~~ for depicting illustrations ~~(A)~~ that have been produced with the image-producing device ~~(5, 6)~~, as well as input means ~~(9)~~ for interactive selection of a body volume in these images ~~(A)~~.

8. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein the body volume filled with blood lies in the aorta or in the left ventricle of the heart.

9. (Currently Amended) A method for the *in vivo* determination of the concentration of a PET tracer in the blood, comprising the steps of:

- production of at least one locally resolved image ~~(A)~~ of a body region;
- determination of the spatial position ~~(I)~~ of a body volume filled with blood on the basis of the image produced ~~(A)~~;
- recording of annihilation quanta ~~(γ_1, γ_2)~~ coming out of the body volume, taking account of their times of flight.

10. (Currently Amended) A method as claimed in claim 9, ~~characterized in that~~ wherein a dynamic~~, preferably three-dimensional PET~~ recording of a further body region takes place, and that the data obtained here ~~are~~ is combined with the established concentration of the PET tracer in the blood.